

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 1614.1092

First Named Inventor or Application Identifier:

Makoto SAOTOME et al.

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231**

1. ☒ Fee Transmittal Form
2. ☒ Specification, Claims & Abstract [Total Pages: 17]
3. ☒ Drawing(s) (35 USC 113) [Total Sheets: 4]
4. ☒ Oath or Declaration [Total Pages: 3]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation by Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) [] Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)/PTO-1449 [] Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
14. ☐ Small Entity Statement(s) [] Statement filed in prior application, status still proper and desired.
15. ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:[] Continuation [] Divisional [] Continuation-in-part (CIP) of prior application No. 1**18. CORRESPONDENCE ADDRESS**

21171

PATENT TRADEMARK OFFICE

NEW APPLICATION FEE TRANSMITTAL

Attorney Docket No. 1614.1092

Application Number

Filing Date November 7, 2000

AMOUNT ENCLOSED

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First Named Inventor

Makoto SAOTOME et al.

FEE CALCULATION (fees effective 10/01/97)

CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS	14 - 20 =	0	X \$ 18.00 =	\$ - 0.00
	INDEPENDENT CLAIMS	1 - 3 =	0	X \$ 80.00 =	0.00
	MULTIPLE DEPENDENT CLAIMS (any number; if applicable)			+ \$240.00 =	0.00
	BASIC FILING FEE				710.00
	Total of above Calculations =				\$ 710.00
	Surcharge for late filing fee, Statement or Power of Attorney (\$130.00)				+ 0.00
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	TOTAL FILING FEE =				\$ 710.00
	Surcharge for filing non-English language application (\$130.00; 37 CFR 1.52(d))				+ 0.00
	Recordation of Assignment (\$40.00; 37 CFR 1.21(h)(1))				+ 40.00
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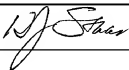
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SUBMITTED BY: STAAS & HALSEY LLP

Typed Name	H. J. Staas	Reg. No.	22,010
Signature		Date	November 7, 2000

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SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT WE, Makoto Saotome, a citizen of Japan residing at Kawasaki, Japan and Nobuhide Maruo, a citizen of Japan residing at Kawasaki, Japan have invented certain new and useful improvements in

COMMUNICATION DEVICE

of which the following is a specification : -

COMMUNICATION DEVICE

5 This application claims the benefit of a
Japanese Patent Application No.2000-156441 filed May
26, 2000, in the Japanese Patent Office, the
disclosure of which is hereby incorporated by
reference.

The present invention generally relates to communication devices, and more particularly to a communication device which has a function of controlling a disconnection of a line which is being used for a communication when an abnormality is detected in a computer equipment which is coupled to the communication device.

In a communication using a communication device such as a modem which is coupled to or built into a computer equipment, control related to disconnection of a line which is being used for the communication is in most cases carried out based on a signal received from the computer equipment. For this reason, if a failure or the like occurs in the computer equipment and a line disconnection instruction is not correctly issued from the computer equipment, the line remains in a connected state. When the line remains in the connected state, the accounting continues to be made with respect to the use of the line and the connection to a destination. Recently, there are more occasions to make a communication using a combination of the computer equipment, the communication device and a wireless telephone set. Consequently, in addition to the problem of the continued accounting being made when the failure is generated in the computer

equipment, the wear of a battery of the wireless telephone set due to the continued communication is also becoming a problem.

With respect to the above described
5 problems, a first method has been proposed to disconnect the line by detecting a no-communication state which is generated when an abnormality is occurs in the computer equipment. However,
10 according to this first method, the no-communication state is not necessarily caused by the abnormality state of the computer equipment, and it is difficult to accurately detect the abnormal state of the computer equipment. As a result, there is a high possibility that an unwanted disconnection of the
15 line will be made.

On the other hand, a second method has been proposed to transmit an exclusive control code with respect to the communication device when an abnormality is generated in the computer equipment.
20 However, according to this second method, it is necessary to modify the hardware and software of the computer equipment from the existing hardware and software in order to generate the exclusive control code.

As described above, it is conventionally
25 impossible to disconnect the line by accurately detecting the abnormal state of the computer equipment using a simple structure or, to disconnect the line by accurately detecting the abnormal state
30 of the computer equipment without the need to modify the existing hardware and software of the computer equipment.

SUMMARY OF THE INVENTION

35 Accordingly, it is a general object of the present invention to provide a novel and useful communication device in which the problems described

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above are eliminated.

Another and more specific object of the present invention is to provide a communication device which can disconnect a line by accurately
5 detecting an abnormal state of a computer equipment, without having to modify existing hardware and software of the computer equipment, and by use of a simple structure.

Still another object of the present
10 invention is to provide a communication device characterized by detecting means for detecting a signal peculiar to a universal serial bus (USB) obtained via the USB, and disconnecting means for
15 disconnecting a line which is being used for a communication when the signal peculiar to the USB is not detected by said detecting means within a predetermined time.

The signal peculiar to the USB may be selected from a group of a frame start (SOF) signal,
20 an interrupt transfer request signal, a control transfer signal and a bulk IN transfer request signal.

According to the communication device of the present invention, it is possible to disconnect
25 a line by accurately detecting an abnormal state of a computer equipment, without having to modify existing hardware and software of the computer equipment, and by use of a simple structure.

Other objects and further features of the
30 present invention will be apparent from the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

35 FIG. 1 is a system block diagram showing a first embodiment of a communication device according to the present invention;

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FIG. 2 is a flow chart for explaining the operation of the first embodiment;

FIG. 3 is a diagram for explaining the first embodiment; and

5 FIG. 4 is a diagram for explaining a second embodiment of the communication device according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 A description will be given of various embodiments of a communication device according to the present invention, by referring to the accompanying drawings.

FIG. 1 is a system block diagram showing a
15 first embodiment of the communication device according to the present invention. In this embodiment, the present invention is applied to a case where a host unit communicates via the communication device and a wireless telephone set.

20 As shown in FIG. 1, a communication device 1 connects a host unit 2 and a wireless telephone set 3. The communication device 1 is connected to the host unit 2 via a universal serial bus (USB) 4. In addition, the communication device 1 is connected
25 to the wireless telephone set 3 via a data line 5-1, a command line 5-2 and a control line 5-3. The wireless telephone set 3 is connected to a network 6 via a line, and connects to a remote unit (not shown) via the network 6.

30 The communication device 1 includes a USB interface (USBIF) 11, a data controller 12, an interrupt detector 13, a timer 14 and a line controller 15. The host unit 2 is formed by a computer equipment such as a personal computer which
35 has a known structure including a CPU (not shown). An application software 21 and a driver software 22 are executed by the CPU of the computer equipment

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which forms the host unit 2. The wireless telephone set 3 is formed by a portable telephone set, a PHS telephone set or the like having a known wireless telephone function 31.

5 The USB 4 is a standardized serial bus which connects a personal computer and a peripheral equipment thereof. By transmitting signals using the USB 4, it is possible to manufacture the peripheral equipment at a low cost. Hence, existing
10 personal computers employ the USB 4 as a standard, as an external bus. This embodiment effectively utilizes the USB 4.

 During a normal operation, the host unit 2 connects via the application software 21 and the
15 driver software 22 to the line, via the communication device 1 and the wireless telephone set 3, to transmit and receive data. The communication device 1 detects a change in the data transmitted from the wireless telephone set 3 and
20 received via the data line 5-1 or, a change in a command received via the command line 5-2, and stores change information related to the detected change in an internal buffer (not shown) of the communication device 1. For example, the internal
25 buffer may be provided within the data controller 12, within the line controller 15 or, within the USBIF 11.

 In order to detect a change of state of the communication device 1, the host unit 2 issues
30 an interrupt transfer request with respect to the communication device 1 at predetermined time intervals. The interrupt transfer request is made by transmitting an interrupt transfer request signal to the communication device 1 via the USB 4. This
35 interrupt transfer request signal is peculiar to the USB 4. An interrupt transfer is made when periodically transferring small amounts of data from

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the communication device 1 to the host unit 2. For example, the change information stored in the internal buffer is transferred from the communication device 1 to the host unit 2 by the interrupt transfer. Because of the structure of the USB 4, a data transfer cannot be started from the communication device 1 even in the case of the interrupt transfer. The data transfer is started by a polling operation which is carried out by the host unit 2 to determine whether or not data to be transferred to the host unit 2 exists within the communication device 1.

The communication device 1 constantly monitors the existence of the interrupt transfer request made via the USB 4. More particularly, the interrupt detector 13 detects the interrupt transfer request signal which is received via the USBIF 11. When a detected time interval of the interrupt transfer request signal is within a detection time interval which is preset in the timer 14, the interrupt detector 13 judges that the operation of the host unit 2 is normal, and the communication via the line which is connected to the wireless telephone set 3 is continued. In this case, the data received via the USB 4 are transferred to the wireless telephone set 3 via the USBIF 11, the data controller 12 and the data line 5-1. In addition, the command received via the USB 4 is transferred to the wireless telephone set 3 via the USBIF 11, the line controller 15 and the command line 5-2. Furthermore, the control signal received via the USB 4 is transferred to the wireless telephone set 3 via the USBIF 11, the line controller 15 and the control line 5-3.

On the other hand, when the detected time interval of the interrupt transfer request signal is longer than the detection time interval preset in

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the timer 14, the interrupt detector 13 judges that the operation of the host unit 2 is abnormal, and the line controller 15 forcibly ends the communication by disconnecting the line which is connected to the wireless telephone set 3. The line can be disconnected by a line disconnecting method which supplies a line disconnect instruction to the wireless telephone set 3 or a line disconnecting method which cuts OFF a power supply of the wireless telephone set 3. The connection of the line which is being used for the communication can be disconnected by supplying a command or a control signal for disconnecting the line from the line controller 15 to the wireless telephone set 3 via the command line 5-2 or the control line 5-3. In this case, it is possible to prevent the accounting from being continued unnecessarily with respect to the use of the line and the connection to a destination. In addition, the power supply of the wireless telephone set 3 can be cut OFF by supplying the command or the control signal for cutting OFF the power supply from the line controller 15 to the wireless telephone set 3 via the command line 5-2 or the control line 5-3. In this case, it is not only possible to prevent the accounting from being continued unnecessarily with respect to the use of the line and the connection to the destination, but it is also possible to prevent unnecessary wear of a battery of the wireless telephone set 3.

FIG. 2 is a flow chart for explaining the operation of this first embodiment. In FIG. 2, a step S1 sets an upper limit value of the timer 14, and sets the line disconnecting method which is to be employed. A step S2 starts a communication via the wireless telephone set 3 based on a communication request signal from the host unit 2, and starts a count of the timer 14. A step S3

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decides whether or not a counted value of the timer 14 exceeds the set upper limit value . If the decision result in the step S3 is NO, a step S4 counts up the counted value of the timer 14. A step 5 S5 decides whether or not an interrupt transfer request is issued with respect to a concerned end point. The end point refers to a part forming an information source or sink during the communication between the host unit 2 and the communication device 1. The process returns to the step S3 if the 10 decision result in the step S5 is NO. On the other hand, if the decision result in the step S5 is YES, a step S6 clears the counted value of the timer 14, and the process returns to the step S3. In addition, 15 if the decision result in the step S3 is YES, a step S7 disconnects the line which is being used for the communication, and the process ends.

The signal peculiar to the USB 4 is of course not limited to the interrupt transfer request 20 signal, and other signals such as a frame start (SOF) signal, a control transfer signal and a bulk IN transfer request signal may be used. The SOF signal is a packet which is issued from the host unit 2 for every $1.0 \text{ ms} \pm 0.05\%$, for example, and 25 indicates the start of each frame. This SOF signal is not issued with respect to a specific communication device or end point, but is issued periodically if the host unit 2 has an appropriate configuration. On the other hand, the control 30 transfer signal is issued when using a control transfer mode in which the communication device 1 transfers configuration information thereof or the like to the host unit 2 and the host unit 2 transfers configuration information thereof or the 35 like to the communication device 1, and also when transferring a small amount of data. The control transfer signal corresponds to a standard device

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request or the like which is defined by the USB 4,
and thus, the control transfer mode is supported
without exception by any unit or device which
supports the USB 4. In addition, even in the case
5 of a request other than the standard device request,
it is possible to use a vendor request as the
control transfer signal to have a peculiar meaning.

When using the bulk IN transfer, it is
possible to use the bulk IN transfer request signal
10 similarly to the interrupt transfer request signal
described above.

When using the SOF signal as the signal
peculiar to the USB 4, it is possible to detect the
abnormality related to the hardware of the host unit
15 such as the cutting OFF of the power supply of the
host unit 2. In addition, when using the interrupt
transfer request signal or the control transfer
signal as the signal peculiar to the USB 4, it is
possible to detect the abnormality of the host unit
20 2 such as hang-up which is caused by software,
because both the interrupt transfer and the control
transfer are not only dependent on the hardware of
the host unit 2 but are also dependent on the
operation of the application software 21 and the
25 driver software 22 for carrying out the
communication. The above described signals peculiar
to the USB 4 are not implemented exclusively for
detecting the abnormality of the host unit 2, and
are used during the normal operation of the host
30 unit 2. For this reason, it is unnecessary to
modify the hardware and software of the host unit 2
in order to realize the present invention.

FIG. 3 is a diagram for explaining this
first embodiment. In FIG. 3, those parts which are
35 the same as those corresponding parts in FIG. 1 are
designated by the same reference numerals, and a
description thereof will be omitted. In FIG. 3, a

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connector 42 is provided on one end of a cable 41, and a connector 43 is provided on the other end of the cable 41. The connector 42 is connected to a USB connector of the host unit 2, and the connector 43 is connected to a connector of the wireless telephone set 3. The cable 41 forms the USB 4. In addition, the communication device 1 shown in FIG. 1 is built into the connector 43. Accordingly, pins of the connector 43 are provided in correspondence with the data line 5-1, the command line 5-2 and the control line 5-3. By providing the communication device 1 within the connector 43, it is possible to connect the host unit 2 and the wireless telephone set 3 to the communication device 1 having the function of automatically disconnecting the line, simply connecting the host unit 2 and the wireless telephone set 3 by the cable 41.

FIG. 4 is a diagram for explaining a second embodiment of the communication device according to the present invention. In FIG. 4, those parts which are the same as those corresponding parts in FIG. 3 are designated by the same reference numerals, and a description thereof will be omitted. In FIG. 4, a connector 52 is provided on one end of a cable 51, and a connector 53 is provided on the other end of the cable 51. The connector 52 is connected to a USB connector of the host unit 2, and the connector 53 is connected to a connector of the wireless telephone set 3. The cable 51 forms the USB 4. In addition, the communication device 1 shown in FIG. 1 is built into the host unit 2 or the wireless telephone set 3. By providing the communication device 1 within the host unit 2 or the wireless telephone set 3, it is possible to connect the host unit 2 and the wireless telephone set 3 to the communication device 1 having the function of automatically disconnecting the line,

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by simply connecting the host unit 2 and the wireless telephone set 3 by the cable 51.

Next, a description will be given of a third embodiment of the communication device according to the present invention. In this third embodiment, a log storage section is further provided to store a log of the disconnection of the line, in addition to the structure of the first or second embodiment described above. For the sake of convenience, it is assumed in this third embodiment that the log storage section is formed by the internal buffer of the communication device 1. However, it is of course possible to form the log storage section by a memory or the like which is independent from the internal buffer. Moreover, the log storage section may be provided within the host unit 2 or within the wireless telephone set 3. By providing the log storage section and storing the log of the disconnection of the line, it is possible to access the log at an arbitrary time from the host unit 2 or, to automatically access the log and notify the log to the user of the host unit 2.

When restoring the host unit 2, the line controller 15 may re-connect to the line which was disconnected, using the log which is stored in the log storage section.

Next, a description will be given of a fourth embodiment of the communication device according to the present invention. In this fourth embodiment, a notifying section is further provided to notify the disconnection of the line to the host unit 2, in addition to the structure of any one of the first through third embodiments described above. In this fourth embodiment, it is assumed for the sake of convenience that the notifying section is formed by the line controller 15. In other words, the line controller 15 of this fourth embodiment

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instructs the disconnection of the line to the wireless telephone set 3, and also notifies the disconnection of the line to the host unit 2 via the USBIF 11 and the USB 4.

5 It is possible to employ a known notifying means when notifying the disconnection of the line to the user of the host unit 2. In other words, the disconnection of the line may be notified to the user by a display output using LED or the like, and
10 an audio output using a buzzer, a melody, voice message or the like. In addition, in a case where an electronic mail function is provided in the wireless telephone set 3 for sending electronic mail, this electronic mail function may be used to notify
15 the disconnection of the line to a manager or the like at a remote location by sending an electronic mail.

 Further, the present invention is not limited to these embodiments, but various variations
20 and modifications may be made without departing from the scope of the present invention.

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WHAT IS CLAIMED IS

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1. A communication device comprising:
detecting means for detecting a signal peculiar
to a universal serial bus (USB) obtained via the
USB; and

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disconnecting means for disconnecting a line
which is being used for a communication when the
signal peculiar to the USB is not detected by said
detecting means within a predetermined time.

15

2. The communication device as claimed in
claim 1, wherein the signal peculiar to the USB is
selected from a group of a frame start (SOF) signal,
an interrupt transfer request signal, a control
transfer signal and a bulk IN transfer request
signal.

25

3. The communication device as claimed in
claim 1, wherein said disconnecting means instructs
a disconnection of the line which is being used for
the communication via a command line or a control
line, with respect to a wireless telephone set which
is coupled to the communication device.

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4. The communication device as claimed in
claim 3, wherein said disconnecting means
disconnects the line which is being used for the
communication by cutting OFF a power supply of the
5 wireless telephone set.

10 5. The communication device as claimed in
claim 1, further comprising:
notifying means for notifying a disconnection
of the line which is being used for the
communication.

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20 6. The communication device as claimed in
claim 5, wherein said notifying means notifies a
disconnection of the line which is being used for
the communication using an electronic mail function
of a wireless telephone set which is coupled to the
communication device.

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30 7. The communication device as claimed in
claim 1, further comprising:
log storage means for storing a log of a
disconnection of the line.

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8. The communication device as claimed in

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claim 7, further comprising:

control means for re-connecting to the line
which was disconnected using the log of the
disconnection of the line stored in said log storage

5 means, when restoring a computer equipment which is
coupled to the communication device via the USB.

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9. The communication device as claimed in
claim 1, wherein said detecting means and said
disconnecting means are built into a connector of a
cable connecting a computer equipment and a wireless
15 telephone set.

20

10. The communication device as claimed
in claim 1, wherein said detecting means and said
disconnecting means are built into one of a computer
equipment and a wireless telephone set which are
coupled via the communication device.

25

11. The communication device as claimed
30 in claim 2, wherein said disconnecting means
instructs a disconnection of the line which is being
used for the communication via a command line or a
control line, with respect to a wireless telephone
set which is coupled to the communication device.

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12. The communication device as claimed
in claim 11, wherein said disconnecting means
disconnects the line which is being used for the
communication by cutting OFF a power supply of the
5 wireless telephone set.

10 13. The communication device as claimed
in claim 11, wherein said detecting means and said
disconnecting means are built into a connector of a
cable connecting a computer equipment and a wireless
telephone set.

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14. The communication device as claimed
20 in claim 11, wherein said detecting means and said
disconnecting means are built into one of a computer
equipment and a wireless telephone set which are
coupled via the communication device.

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ABSTRACT OF THE DISCLOSURE

A communication device is constructed to include a detecting section for detecting a signal peculiar to a universal serial bus (USB) obtained via the USB, and a disconnecting section for disconnecting a line which is being used for a communication when the signal peculiar to the USB is not detected by the detecting section within a predetermined time.

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FIG.1

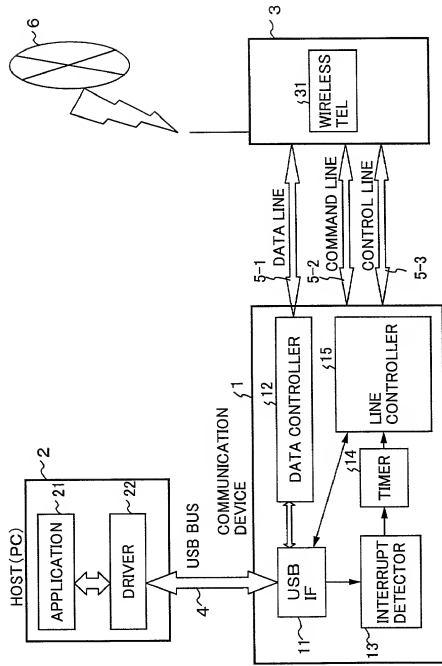
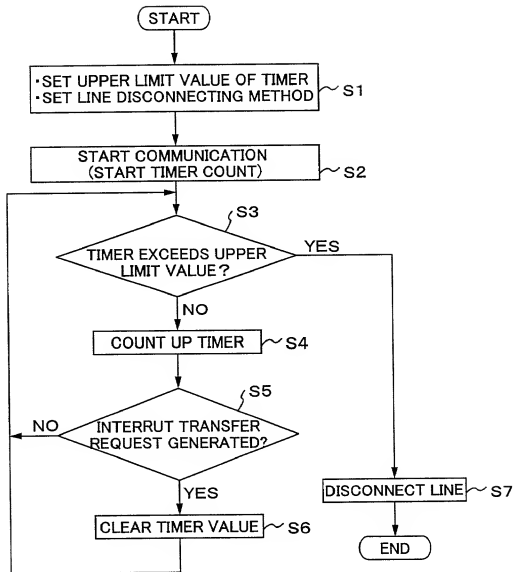


FIG.2



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FIG. 3

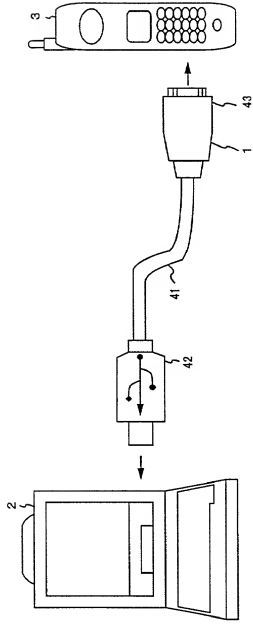
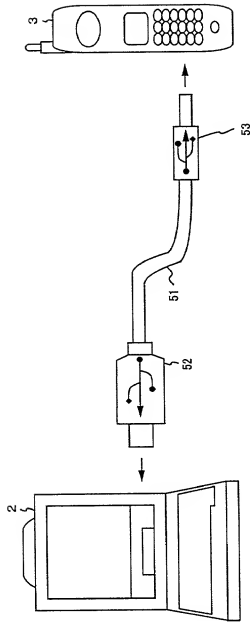


FIG. 4



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Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

COMMUNICATION DEVICE

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

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（該当する場合） _____ に訂正されました。

- ☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1章56項に規定されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

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私は、米国法典第 3 5 条 (a) - (d) 項又は 3 6 5 条 (b) 項に基づき、米国以外の国の少なくとも一か国を指定している特許協力条約 3 6 5 (a) 項に基づき国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

Prior Foreign Application(s)

外国での先行出願

Pat. Appl. No. 2000-156441 Japan
(Number) (Country)
(番号) (国名)

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I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed
優先権主張なし

26/May/2000
(Day/Month/Year Filed)
(出願年月日)

(Day/Month/Year Filed)
(出願年月日)

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(Application No.) (Filing Date)
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(Application No.) (Filing Date)
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I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Status: Patented, Pending, Abandoned)
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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James D. Halsey, Jr., 22,729; Harry John Staas, 22,010; David M. Picher, 25,908; John C. Garvey, 28,507; J. Randall Beckers, 30,358; William F. Herbert, 31,024; Richard A. Golhofer, 31,106; Mark J. Henry, 36,162; Gene M. Garner II, 34,172; Michael D. Stein, 37,240; Paul I. Kravetz, 35,230; Gerald P. Joyce, III, 37,648; Todd E. Marlette, 35,269; Harlan B. Williams, Jr., 34,756; George N. Stevens, 36,938; Michael C. Soldner, 41,455; Norman L. Ourada, 41,235; Kevin R. Sprvak, P-43,148; and William M. Scherler, 35,348 (agent)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

書類送付先

Send Correspondence to:

STAAS & HALSEY
 700 Eleventh Street, N.W.
 Suite 500
 Washington, D.C. 20001

直接電話連絡先: (名前及び電話番号)

Direct Telephone Calls to: (name and telephone number)

STAAS & HALSEY
 (202) 434-1500

唯一または第一発明者		Full name of sole or first inventor Makoto Saotome
発明者の署名	日付	Inventor's signature Makoto Saotome Date October 27, 2000
住所		Residence Kawasaki, Japan
国籍		Citizenship Japan
私書箱		Post Office Address c/o FUJITSU LIMITED, 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki-shi, Kanagawa, 211-8588 Japan
第二共同発明者		Full name of second joint inventor, if any Nobuhide Maruo
第二共同発明者	日付	Second inventor's signature Nobuhide Maruo Date October 27, 2000
住所		Residence Kawasaki, Japan
国籍		Citizenship Japan
私書箱		Post Office Address c/o FUJITSU LIMITED, 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki-shi, Kanagawa, 211-8588 Japan

(第三以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors.)